

E1 (d) subjecting said portion of said heavy hydrocarbon fraction in said primary reactor to second conditions effective to convert at least a portion of said heavy hydrocarbons to ethylene.

[Please CANCEL claim 42 without prejudice or disclaimer.

E2 43. (Twice Amended) The method of claim 41 wherein said primary reactor contains zeolite molecular sieve catalyst.

[Please CANCEL claims 44, 46, 48, 49, 50 and 52 without prejudice or disclaimer.

19 55. (Twice Amended) A method for increasing ethylene yield during conversion of oxygenates to olefins comprising:

E3 (a) contacting a feed including an oxygenate in a primary reactor with a small pore non-zeolitic molecular sieve catalyst under conditions effective to produce a product including ethylene;

(b) separating said product into a product fraction containing the ethylene and a heavy hydrocarbon fraction including heavy hydrocarbons; and

(c) recycling at least a portion of said heavy hydrocarbon fraction to said primary reactor.

[Please ADD new claims 62-86, as follows:

62. (NEW) The method of claim 41, wherein the second conditions are the same as the first conditions.

E4 63. (NEW) The method of claim 41, wherein the primary reactor has a WHSV of at least about 0.01 hr⁻¹.

64. (NEW) The method of claim 63, wherein the WHSV is from about 0.01 hr⁻¹ to about 5000 hr⁻¹.

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65. (NEW) The method of claim ~~63~~⁷, wherein the WHSV is at least about 1.0 hr⁻¹.

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66. (NEW) The method of claim ~~65~~⁹, wherein the WHSV is from about 1.0 to about 2000 hr⁻¹.

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67. (NEW) The method of claim ~~65~~⁷, wherein the WHSV is at least about 20 hr⁻¹.

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68. (NEW) The method of claim ~~67~~¹¹, wherein the WHSV is from about 20 hr⁻¹ to about 2000 hr⁻¹.

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69. (NEW) The method of claim ~~55~~¹⁹, wherein the primary reactor has a WHSV of at least about 0.01 hr⁻¹.

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70. (NEW) The method of claim ~~69~~²⁶, wherein the WHSV is from about 0.01 hr⁻¹ to about 5000 hr⁻¹.

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71. (NEW) The method of claim ~~69~~²⁵, wherein the WHSV is at least about 1.0 hr⁻¹.

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72. (NEW) The method of claim ~~71~~²⁷, wherein the WHSV is from about 1.0 to about 2000 hr⁻¹.

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73. (NEW) The method of claim ~~69~~²⁵, wherein the WHSV is at least about 20 hr⁻¹.

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74. (NEW) The method of claim ~~73~~²⁹, wherein the WHSV is from about 20 hr⁻¹ to about 1000 hr⁻¹.

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75. (NEW) The method of claim ~~41~~¹, wherein the first conditions include a temperature of from about 200°C to about 700°C.

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126. (NEW) The method of claim ~~75~~¹³, wherein the temperature is from about 250°C to about 600°C.

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77. (NEW) The method of claim ~~76~~¹⁴, wherein the temperature is from about 300°C to about 500°C.

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78. (NEW) The method of claim ~~55~~¹⁹, wherein the conditions include a temperature of from about 200°C to about 700°C.

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79. (NEW) The method of claim ~~78~~³¹, wherein the temperature is from about 250°C to about 600°C.

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80. (NEW) The method of claim ~~79~~³², wherein the temperature is from about 300°C to about 500°C.

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81. (NEW) The method of claim ~~41~~¹, wherein the feed has an oxygenate partial pressure of from about 0.1 kPa to about 100 MPa.

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82. (NEW) The method of claim ~~81~~¹⁶, wherein the oxygenate partial pressure is from about 6.9 kPa to about 34 MPa.

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83. (NEW) The method of claim ~~82~~¹⁷, wherein the oxygenate partial pressure is from about 48 kPa to about 0.3 MPa.

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84. (NEW) The method of claim ~~53~~¹⁹, wherein the feed has an oxygenate partial pressure of from about 0.1 kPa to about 100 MPa.

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85. (NEW) The method of claim ~~84~~³⁴, wherein the oxygenate partial pressure is from about 6.9 kPa to about 34 MPa.

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86. (NEW) The method of claim 85, wherein the oxygenate partial pressure is from about 48 kPa to about 0.3 MPa.

REMARKS

I. Status of the Claims

Upon entry of this amendment, claims 41, 43, 45, 47, 51, 55, 56 and 58-86 will be pending in the above-identified application. Claims 41, 45, 51, 55, 56, 58 and 59 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Martino (GB 2171718) in view of Kaiser I (USP 4,677,243) and Kaiser II (USP 4,527,001). Claims 43, 47, 60 and 61 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Martino in view of Kaiser I and Kaiser II, and further in view of Hagiwara (DE 3524890). By this amendment, claims 41, 43 and 55 have been amended, claims 42, 44, 46, 48, 49, 50 and 52 have been canceled, and claims 62-86 have been added. No new matter has been added.

II. Examiner Interview

Applicants would like to thank Examiner Griffin for the courtesy extended to their representatives in the January 28, 2002 interview. In the interview, Applicants' representatives discussed the proposed amendment to the claims amending the claims to the production of ethylene. The Examiner stated that the data would be evaluated to see if it is commensurate in scope with the claims.

III. Response to Rejections Under 35 U.S.C. § 103(a)

Claims 41, 45, 51, 55, 56, 58 and 59 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Martino in view of Kaiser I and Kaiser II. Claims 43, 47, 60 and 61 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Martino in view of Kaiser I and Kaiser II, and further in view of Hagiwara. Applicant respectfully traverses these rejections.

Independent claim 41 is directed to a method of increasing ethylene yield during conversion of oxygenates to olefins including contacting a feed including an oxygenate in a primary reactor with a small pore non-zeolitic molecular sieve catalyst under first conditions